

SKYWORKS®

## DATA SHEET

# SKY67150-396LF: 300 to 2200 MHz Ultra Low-Noise Amplifier

## Applications

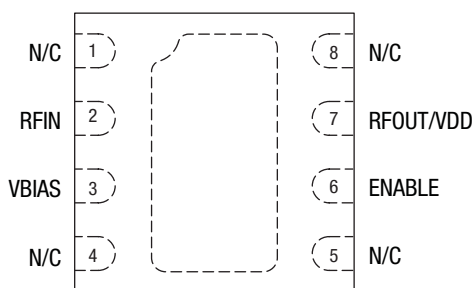
- LTE, GSM, WCDMA, HSDPA macro and micro base stations
- UHF and L-band ultra low-noise receivers
- Cellular repeaters, DAS and RRH/RRUs
- High temperature transceiver applications to +105 °C

## Features

- Ultra-low Evaluation Board NF of 0.23 dB @ 849 MHz
- High OIP3 performance: +39 dBm
- Adjustable supply current from 20 to 100 mA
- Flexible bias voltage: 3 to 5 V
- Temperature and process-stable active bias
- Miniature DFN (8-pin, 2 x 2 mm) package (MSL1 @ 260 °C per JEDEC J-STD-020)

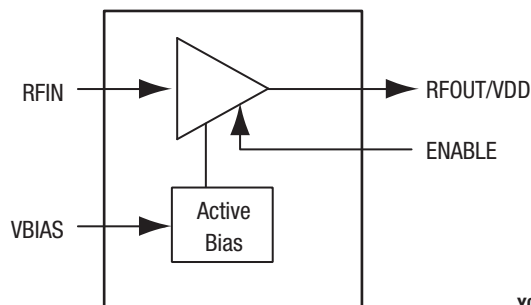


Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04-0074.



Y0004

**Figure 2. SKY67150-396LF Pinout – 8-Pin DFN (Top View)**



Y0003

**Figure 1. SKY67150-396LF Block Diagram**

## Description

The SKY67150-396LF is GaAs, pHEMT Low-Noise Amplifier (LNA) with an active bias, high linearity, superior gain, and industry-leading Noise Figure (NF) performance. The device features Skyworks advanced, pHEMT enhancement mode process in a compact 2 x 2 mm, 8-pin Dual Flat No-Lead (DFN) package.

The internal active bias circuitry provides stable performance over temperature and process variation. The device offers the ability to externally adjust supply current. Supply voltage is applied to the RFOUT/VDD pin through an RF choke inductor. The RFIN and RFOUT/VDD pins should be DC blocked to ensure proper operation.

The SKY67150-396LF operates in the frequency range of 300 to 2200 MHz using a common layout and band-specific tunes. Operation with high gain and a low NF at frequencies as low as 100 MHz is possible with degraded input return loss.

A functional block diagram is shown in Figure 1. The pin configuration and package are shown in Figure 2. Signal pin assignments and functional pin descriptions are provided in Table 1.

**Table 1. SKY67150-396LF Signal Descriptions**

| Pin | Name  | Description  | Pin | Name      | Description   |
|-----|-------|--|-----|-----------|---|
| 1   | N/C   | No connection. May be connected to ground with no change in performance. | 5   | N/C       | No connection. May be connected to ground with no change in performance.        |
| 2   | RFIN  | RF input. DC blocking capacitor required.                                | 6   | ENABLE    | Enable pin. Active low = amplifier “on” state                                   |
| 3   | VBIAS | Bias voltage for input gate. External resistor sets current consumption. | 7   | RFOUT/VDD | RF output. Apply VDD through RF choke inductor. DC blocking capacitor required. |
| 4   | N/C   | No connection. May be connected to ground with no change in performance. | 8   | N/C       | No connection. May be connected to ground with no change in performance.        |

## Electrical and Mechanical Specifications

The absolute maximum ratings of the SKY67150-396LF are provided in Table 2. Electrical specifications are provided in Tables 3 through 7.

Typical performance characteristics are illustrated in Figures 3 through 17.

**Table 2. SKY67150-396LF Absolute Maximum Ratings**

| Parameter                           | Symbol           | Minimum | Maximum | Units |
|-------------------------------------|------------------|---------|---------|-------|
| Supply voltage                      | V <sub>DD</sub>  |         | 5.5     | V     |
| Quiescent supply current            | I <sub>DQ</sub>  |         | 120     | mA    |
| RF input power                      | P <sub>IN</sub>  |         | +21     | dBm   |
| Storage temperature                 | T <sub>STG</sub> | −40     | +150    | °C    |
| Operating temperature               | T <sub>A</sub>   | −40     | +105    | °C    |
| Electrostatic Discharge:            | ESD              |         |         |       |
| Charged Device Model (CDM), Class 4 |                  |         | 1000    | V     |
| Human Body Model (HBM), Class 1A    |                  |         | 250     | V     |
| Machine Model (MM), Class A         |                  |         | 30      | V     |

**Notes:** Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

**CAUTION:** Although this device is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

**Table 3. SKY67150-396LF Electrical Specifications: Thermal Data (Note 1)**

(V<sub>DD</sub> = 5 V, T<sub>A</sub> = +25 °C, P<sub>IN</sub> = −25 dBm, Characteristic Impedance [Z<sub>0</sub>] = 50 Ω, Unless Otherwise Noted)

| Parameter  | Symbol          | Test Condition   | Min | Typical | Max | Units |
|--|-----------------|--|-----|---------|-----|-------|
| Thermal resistance   | Θ <sub>JC</sub> |  |     | 45      |     | °C/W  |
| Channel temperature @ +85 °C reference (package heat slug) |                 | V <sub>DD</sub> = 5 V, I <sub>DQ</sub> = 82 mA, no RF applied, dissipated power = 0.35 W |     | 103     |     | °C    |

**Note 1:** Performance is guaranteed only under the conditions listed in this Table.

**Table 4. SKY67150-396LF Electrical Specifications: 650 to 1100 MHz Optimized Tuning (Note 1)**  
**( $V_{DD} = 5\text{ V}$ ,  $T_A = +25\text{ }^{\circ}\text{C}$ ,  $P_{IN} = -20\text{ dBm}$ , Characteristic Impedance [ $Z_0$ ] =  $50\text{ }\Omega$ , Unless Otherwise Noted)**

| Parameter                                    | Symbol          | Test Condition  | Min   | Typical | Max  | Units         |
|--|-----------------|---|-------|---------|------|---------------|
| <b>RF Specifications</b>                     |                 |   |       |         |      |               |
| Noise Figure                                 | NF              | @ 849 MHz, includes Evaluation Board loss                                   |       | 0.23    | 0.38 | dB            |
| Small signal gain                            | S <sub>21</sub> | @ 849 MHz   | 19.0  | 20.5    |      | dB            |
| Input return loss                            | S <sub>11</sub> | @ 849 MHz   |       | 11      |      | dB            |
| Output return loss                           | S <sub>22</sub> | @ 849 MHz   |       | 20      |      | dB            |
| Reverse isolation                            | S <sub>12</sub> | @ 849 MHz   |       | 28      |      | dB            |
| 3 <sup>rd</sup> Order Input Intercept Point  | IIP3            | @ 849 MHz,<br>$\Delta f = 1\text{ MHz}$ ,<br>$P_{IN} = -20\text{ dBm/tone}$ | +15.5 | +18.5   |      | dBm           |
| 3 <sup>rd</sup> Order Output Intercept Point | OIP3            | @ 849 MHz,<br>$\Delta f = 1\text{ MHz}$ ,<br>$P_{IN} = -20\text{ dBm/tone}$ | +36   | +39     |      | dBm           |
| 1 dB Input Compression Point                 | IP1dB           | @ 849 MHz   | -0.5  | +1.5    |      | dBm           |
| 1 dB Output Compression Point                | OP1dB           | @ 849 MHz   | +19   | +21     |      | dBm           |
| <b>DC Specifications</b>                     |                 |   |       |         |      |               |
| Supply voltage                               | $V_{DD}$        |   |       | 5       |      | V             |
| Quiescent supply current                     | $I_{DQ}$        | Set with external resistor  | 70    | 82      | 95   | mA            |
| Bias current                                 | $I_{BIAS}$      |   |       | 500     |      | $\mu\text{A}$ |
| Enable voltage:<br>Gain mode                 | $V_{ENABLE}$    |   | 0     |         | 0.2  | V             |
| Power-down mode                              |                 |   | 1.5   |         | 5.5  | V             |

**Note 1:** Performance is guaranteed only under the conditions listed in this Table.

## Typical Performance Characteristics, 650 to 1100 MHz

( $V_{DD} = 5\text{ V}$ ,  $T_A = +25\text{ }^{\circ}\text{C}$ ,  $P_{IN} = -20\text{ dBm}$ , Characteristic Impedance [ $Z_0$ ] =  $50\text{ }\Omega$ , Unless Otherwise Noted)

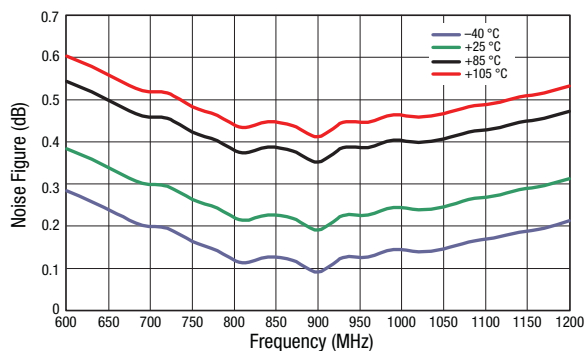


Figure 3. Evaluation Board NF vs Frequency over Temperature

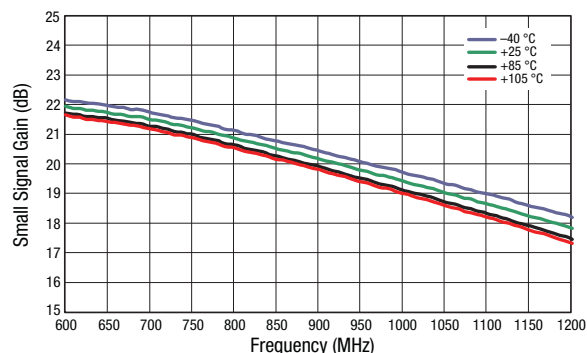


Figure 4. Narrow Band Gain vs Frequency over Temperature

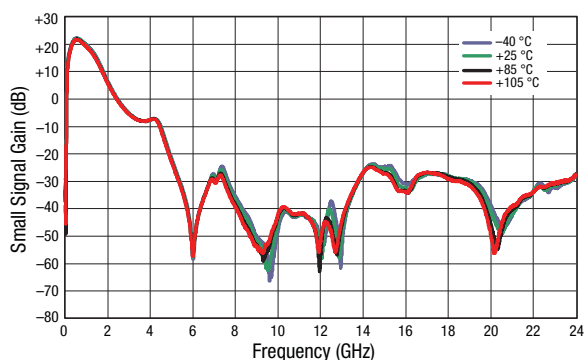


Figure 5. Broadband Gain vs Frequency over Temperature

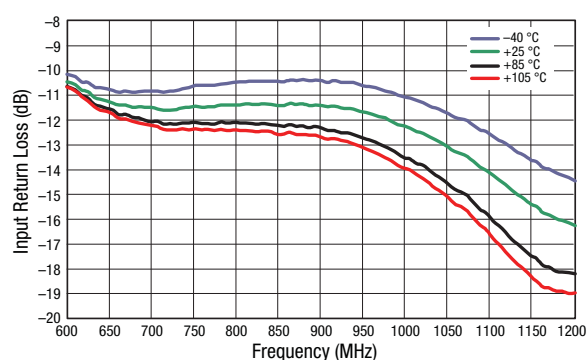


Figure 6. Narrowband Input Return Loss vs Frequency over Temperature

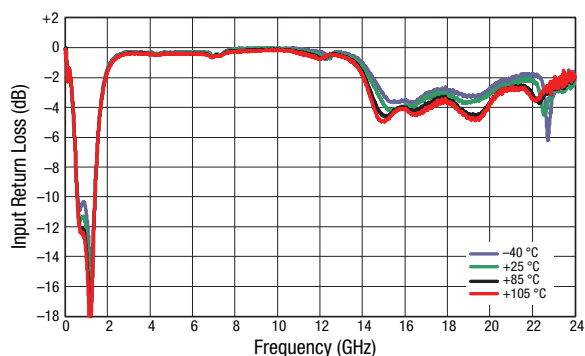


Figure 7. Broadband Input Return Loss vs Frequency over Temperature

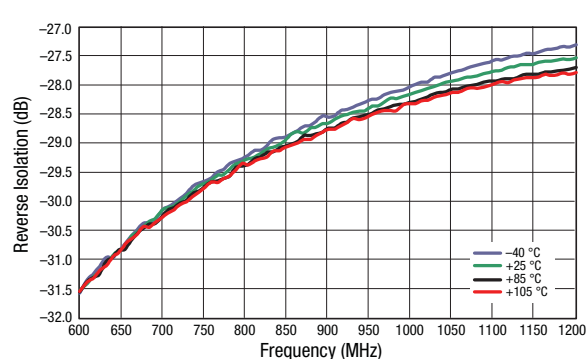
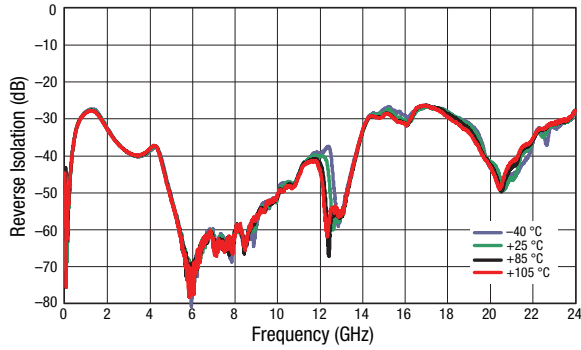
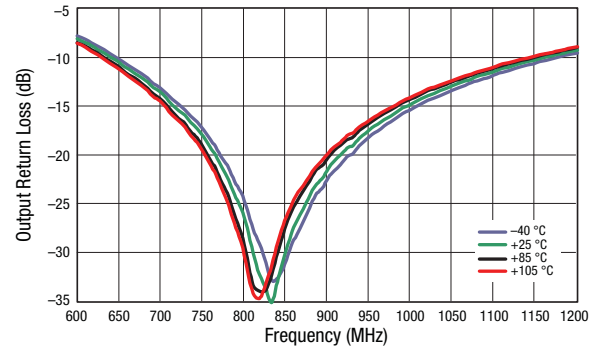


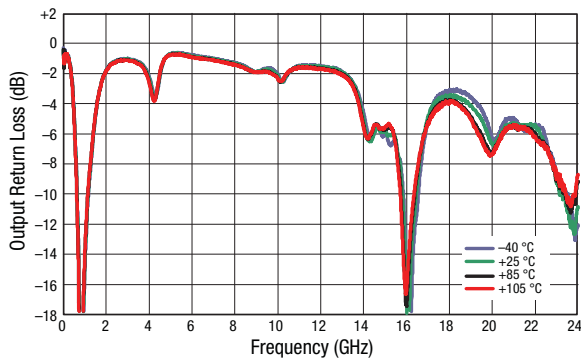
Figure 8. Narrowband Reverse Isolation vs Frequency over Temperature



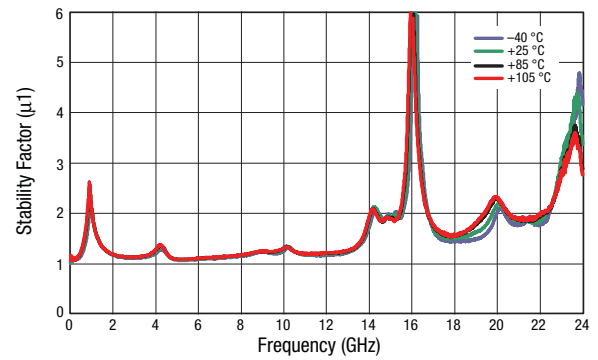
**Figure 9. Broadband Reverse Isolation vs Frequency over Temperature**



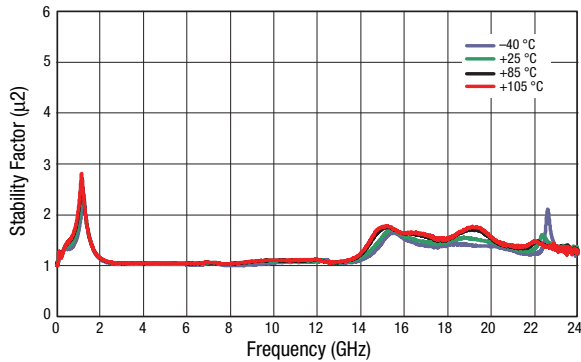
**Figure 10. Narrowband Output Return Loss vs Frequency over Temperature**



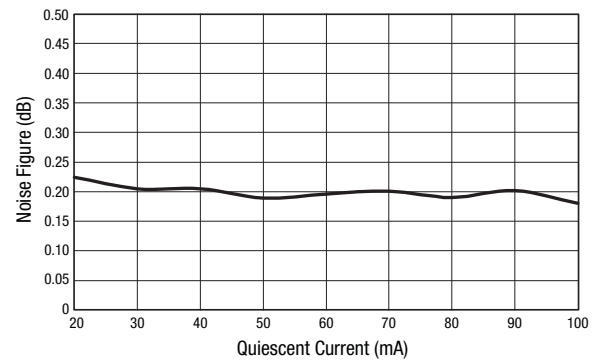
**Figure 11. Broadband Output Return Loss vs Frequency over Temperature**



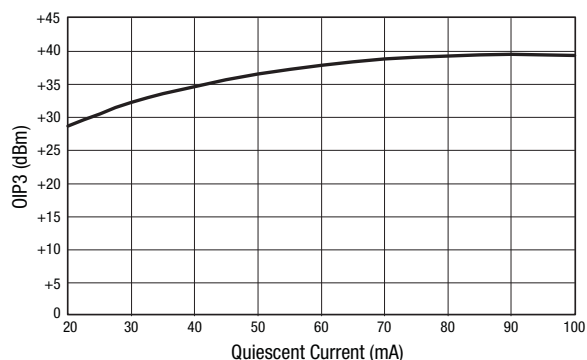
**Figure 12. Stability Factor ( $\mu_1$ ) vs Frequency over Temperature**



**Figure 13. Stability Factor ( $\mu_2$ ) vs Frequency over Temperature**



**Figure 14. Evaluation Board NF vs Quiescent Current over Frequency Using Band-Specific BOM (@ 849 MHz)**



**Figure 15. OIP3 vs Quiescent Current over Frequency Using Band-Specific BOM (@ 849 MHz)**

**Table 5. SKY67150-396LF Electrical Specifications: 380 to 530 MHz Optimized Tuning (Note 1)**

( $V_{DD} = 5\text{ V}$ ,  $T_A = +25\text{ }^{\circ}\text{C}$ ,  $P_{IN} = -25\text{ dBm}$ , Characteristic Impedance [ $Z_0$ ] =  $50\text{ }\Omega$ , Unless Otherwise Noted)

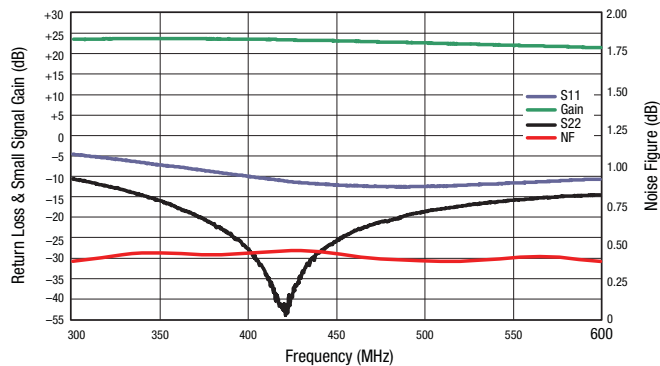
| Parameter                                    | Symbol          | Test Condition   | Min  | Typical | Max  | Units         |
|--|-----------------|--|------|---------|------|---------------|
| <b>RF Specifications</b>                     |                 |  |      |         |      |               |
| Noise Figure                                 | NF              | @ 450 MHz, includes Evaluation Board loss                              |      | 0.45    | 0.60 | dB            |
| Small signal gain                            | S <sub>21</sub> | @ 450 MHz  | 21.5 | 23.0    |      | dB            |
| Input return loss                            | S <sub>11</sub> | @ 450 MHz  |      | 12      |      | dB            |
| Output return loss                           | S <sub>22</sub> | @ 450 MHz  |      | 20      |      | dB            |
| Reverse isolation                            | S <sub>12</sub> | @ 450 MHz  |      | 33      |      | dB            |
| 3 <sup>rd</sup> Order Input Intercept Point  | IIP3            | @ 450 MHz, $\Delta f = 1\text{ MHz}$ , $P_{IN} = -25\text{ dBm/ tone}$ | +10  | +13     |      | dBm           |
| 3 <sup>rd</sup> Order Output Intercept Point | OIP3            | @ 450 MHz, $\Delta f = 1\text{ MHz}$ , $P_{IN} = -25\text{ dBm/ tone}$ | +33  | +36     |      | dBm           |
| 1 dB Input Compression Point                 | IP1dB           | @ 450 MHz  | -5   | -3      |      | dBm           |
| 1 dB Output Compression Point                | OP1dB           | @ 450 MHz  | +17  | +19     |      | dBm           |
| <b>DC Specifications</b>                     |                 |  |      |         |      |               |
| Supply voltage                               | $V_{DD}$        |  |      | 5       |      | V             |
| Quiescent supply current                     | $I_{DQ}$        | Set with external resistor   |      | 82      |      | mA            |
| Bias current                                 | $I_{BIAS}$      |  |      | 500     |      | $\mu\text{A}$ |

**Note 1:** Performance is guaranteed only under the conditions listed in this Table.

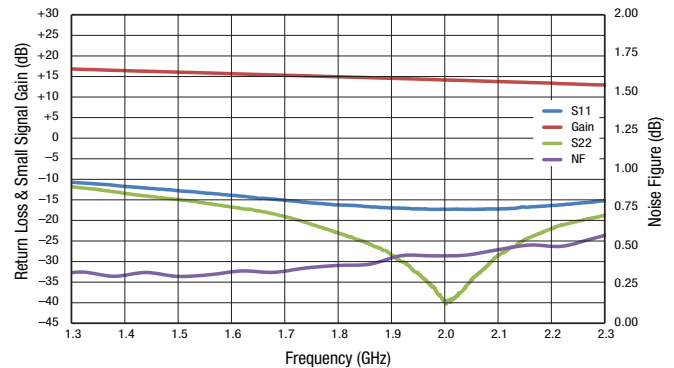
**Table 6. SKY67150-396LF Electrical Specifications: 1400 to 2200 MHz Optimized Tuning (Note 1)**  
**( $V_{DD} = 5\text{ V}$ ,  $T_A = +25\text{ }^{\circ}\text{C}$ ,  $P_{IN} = -25\text{ dBm}$ , Characteristic Impedance [ $Z_0$ ] =  $50\text{ }\Omega$ , Unless Otherwise Noted)**

| Parameter                                    | Symbol     | Test Condition  | Min   | Typical | Max  | Units         |
|--|------------|---|-------|---------|------|---------------|
| <b>RF Specifications</b>                     |            |   |       |         |      |               |
| Noise Figure                                 | NF         | @ 1900 MHz, includes Evaluation Board loss                              |       | 0.38    | 0.53 | dB            |
| Small signal gain                            | S21        | @ 1900 MHz  | 13.0  | 14.5    |      | dB            |
| Input return loss                            | S11        | @ 1900 MHz  |       | 17      |      | dB            |
| Output return loss                           | S22        | @ 1900 MHz  |       | 20      |      | dB            |
| Reverse isolation                            | S12        | @ 1900 MHz  |       | 23      |      | dB            |
| 3 <sup>rd</sup> Order Input Intercept Point  | IIP3       | @ 1900 MHz, $\Delta f = 1\text{ MHz}$ , $P_{IN} = -25\text{ dBm/ tone}$ | +19   | +22     |      | dBm           |
| 3 <sup>rd</sup> Order Output Intercept Point | OIP3       | @ 1900 MHz, $\Delta f = 1\text{ MHz}$ , $P_{IN} = -25\text{ dBm/ tone}$ | +33.5 | +36.5   |      | dBm           |
| 1 dB Input Compression Point                 | IP1dB      | @ 1900 MHz  | +2.5  | +4.5    |      | dBm           |
| 1 dB Output Compression Point                | OP1dB      | @ 1900 MHz  | +16   | +18     |      | dBm           |
| <b>DC Specifications</b>                     |            |   |       |         |      |               |
| Supply voltage                               | $V_{DD}$   |   |       | 5       |      | V             |
| Quiescent supply current                     | $I_{DQ}$   | Set with external resistor  |       | 82      |      | mA            |
| Bias current                                 | $I_{BIAS}$ |   |       | 500     |      | $\mu\text{A}$ |

**Note 1:** Performance is guaranteed only under the conditions listed in this Table.



**Figure 16. Evaluation Board NF, Gain, and Return Losses for 380 to 530 MHz Tuning**



**Figure 17. Evaluation Board NF, Gain, and Return Losses for 1400 to 2200 MHz Tuning**

**Table 7. Noise Parameters vs Frequency (@ +25 °C, 5 V, 70 mA)**

| Frequency (GHz) | FMIN (dB) | Gamma opt (Mag) | Gamma opt (Phase) | Noise Resistance (RN) ( $\Omega$ ) | Associated Gain (dB) | Maximum Gain (GMAX) (dB) |
|-----------------|-----------|-----------------|-------------------|------------------------------------|----------------------|--------------------------|
| 0.4             | 0.3356    | 0.3898          | -1.65             | 0.063                              | 26.874               | 26.7297                  |
| 0.45            | 0.3187    | 0.3471          | 2.44              | 0.0318                             | 26.112               | 26.0677                  |
| 0.5             | 0.3287    | 0.1473          | -60.08            | 0.0484                             | 25.6849              | 25.666                   |
| 0.55            | 0.303     | 0.3392          | 6.77              | 0.0432                             | 24.8282              | 24.8229                  |
| 0.6             | 0.2702    | 0.2931          | 7.19              | 0.0347                             | 24.2668              | 24.2489                  |
| 0.65            | 0.2682    | 0.3336          | 19.52             | 0.0416                             | 23.7339              | 23.7001                  |
| 0.7             | 0.2735    | 0.3735          | 15.75             | 0.0508                             | 23.2435              | 23.2303                  |
| 0.75            | 0.2517    | 0.3303          | 18.12             | 0.0434                             | 22.7786              | 22.7593                  |
| 0.8             | 0.1996    | 0.2104          | 40.79             | 0.0494                             | 22.3308              | 22.1323                  |
| 0.85            | 0.1908    | 0.334           | 16.5              | 0.0628                             | 21.9055              | 21.8755                  |
| 0.9             | 0.1925    | 0.373           | 21                | 0.0341                             | 21.501               | 21.4886                  |
| 0.95            | 0.1946    | 0.3857          | 39.09             | 0.0271                             | 21.1104              | 21.0495                  |
| 1.1             | 0.2164    | 0.3831          | 34.68             | 0.0574                             | 20.0289              | 20.0043                  |
| 1.2             | 0.2327    | 0.3597          | 40.72             | 0.0665                             | 19.3803              | 19.3273                  |
| 1.3             | 0.2482    | 0.3419          | 41.76             | 0.049                              | 18.7816              | 18.703                   |
| 1.4             | 0.2798    | 0.3207          | 48.16             | 0.0573                             | 18.2235              | 18.1058                  |
| 1.5             | 0.3092    | 0.2854          | 59.17             | 0.0532                             | 17.7114              | 17.5101                  |
| 1.6             | 0.3287    | 0.312           | 75.86             | 0.0976                             | 17.2272              | 16.9687                  |
| 1.8             | 0.3516    | 0.4428          | 68.41             | 0.1833                             | 16.34                | 16.2997                  |
| 2.1             | 0.4897    | 0.4233          | 71.86             | 0.1996                             | 15.1948              | 15.1438                  |
| 2.3             | 0.5014    | 0.2079          | 70.76             | 0.0591                             | 14.5509              | 14.0753                  |



## Evaluation Board Description

The SKY67150-396LF Evaluation Board is used to test the performance of the SKY67150-396LF LNA. Three different boards are available for different frequency operations: 650 to 1100 MHz, 380 to 530 MHz, and 1400 to 2200 MHz.

An assembly drawing for the Evaluation Board is shown in Figure 18. The layer detail is provided in Figure 19. An Evaluation Board schematic diagram is provided in Figure 20. Tables 8, 9, and 10 provide the Bill of Materials (BOM) list for the three different Evaluation Board tuning frequencies.

## Package Dimensions

The PCB layout footprint for the SKY67150-396LF is provided in Figure 21. Typical case markings are shown in Figure 22. Package dimensions for the 8-pin DFN are shown in Figure 23, and tape and reel dimensions are provided in Figure 24.

## Package and Handling Information

Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The SKY67150-396LF is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. It can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, *Solder Reflow Information*, document number 200164.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.

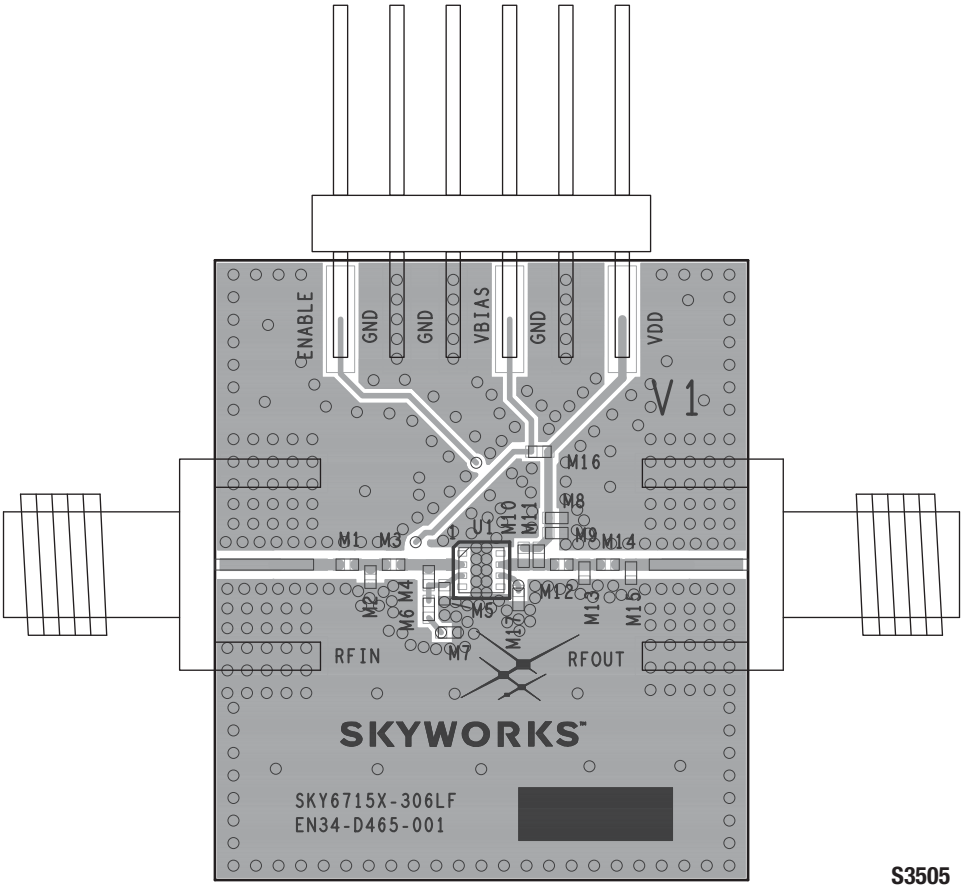


Figure 18. SKY67150-396LF Evaluation Board Assembly Diagram

| Cross Section | Name     | Thickness (mm)                  | Material     |
|---------------|----------|---------------------------------|--------------|
|               | MSK-NS   |                                 |              |
|               | TRA-NS   | 0.03556                         | Cu foil      |
|               | Laminate | 0.254 ± 0.152                   | Rogers 4350B |
|               | TRA-2    | 0.0178                          | Cu foil      |
|               | Laminate | 0.889 nom. FR4 Prepreg (Note 1) |              |
|               | TRA-3    | 0.0178                          | Cu foil      |
|               | Laminate | 0.254 ± 0.152                   | FR4 Core     |
|               | TRA-FS   | 0.0178                          | Cu foil      |
|               | MSK-PS   |                                 |              |

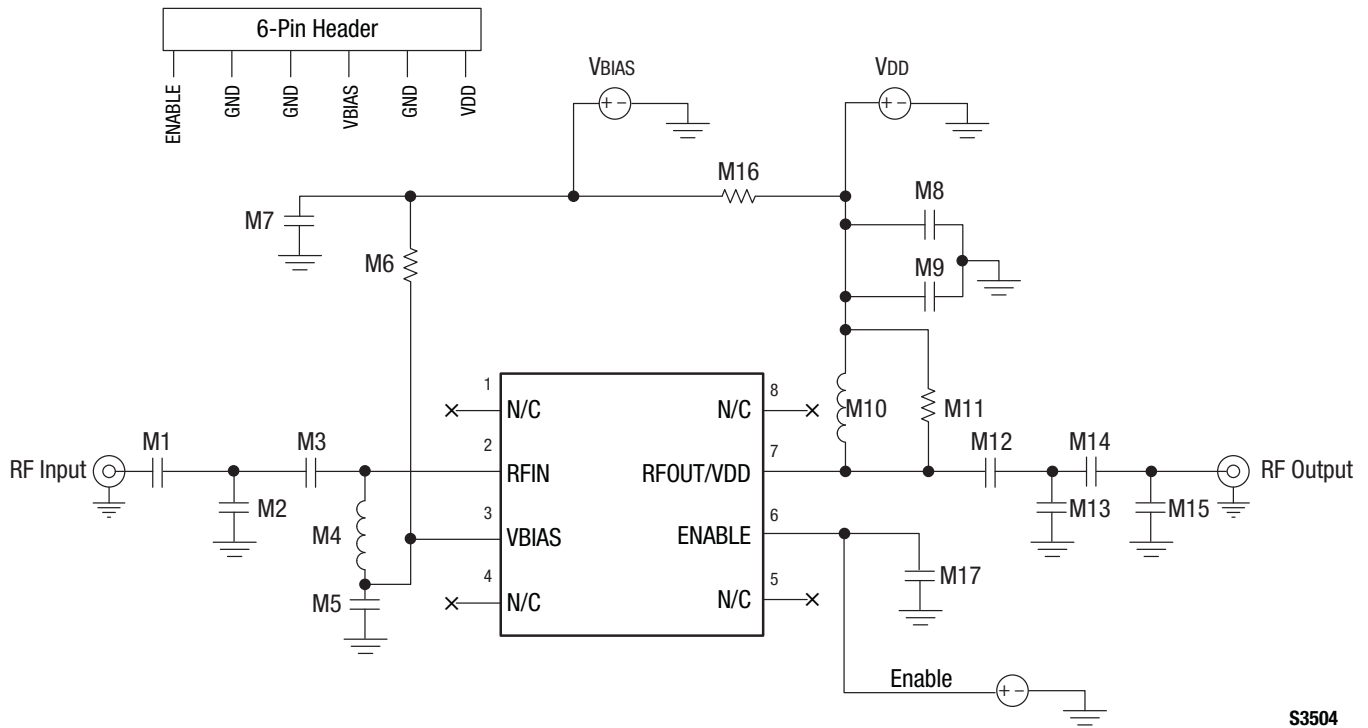
Note 1: Adjust this thickness to meet total thickness goal.

General Notes:

Material: Rogers R04350,  $\epsilon_r = 3.66$   
Layer 1 thickness: 0.254 mm  
Overall board thickness: 1.575 mm  
50  $\Omega$  transmission line width: 0.522 mm  
Coplanar ground spacing: 0.394 mm  
Via diameter: 0.254 mm

S2530

Figure 19. Layer Detail Physical Characteristics



S3504

Figure 20. SKY67150-396LF Evaluation Board Schematic

Table 8. SKY67150-396LF Evaluation Board Bill of Materials (650 to 1100 MHz Tuning)

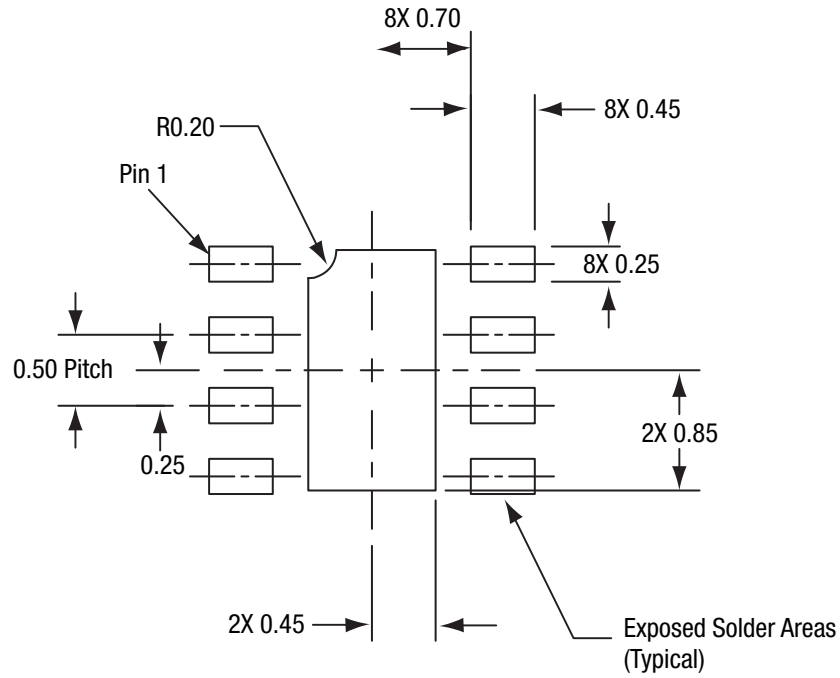
| Component | Description | Value          | Size | Manufacturer         | Part Number       |
|-----------|-------------|----------------|------|----------------------|-------------------|
| M1        | Inductor    | 8.2 nH         | 0603 | Coilcraft HP         | 0603HP-8N2X_L     |
| M2, M7    |             | DNP            |      |                      |                   |
| M3        | Capacitor   | 20 pF          | 0402 | Murata GJM           | GJM1555C1H200JB01 |
| M4        | Inductor    | 100 nH         | 0402 | Coilcraft HP         | 0402HPH-R10X_L    |
| M5, M17   | Capacitor   | 1000 pF        | 0402 | Murata GRM           | GRM1555C1H102JZ01 |
| M6        | Resistor    | 9.1 k $\Omega$ | 0402 | Kamaya RMC, 1/16S 1% | RMC1/16S-9101FTH  |
| M8        | Capacitor   | 10000 pF       | 0402 | Murata GRM           | GRM155R71H103KA88 |
| M9, M12   | Capacitor   | 10 pF          | 0402 | Murata GRM           | GRM1555C1H100JZ01 |
| M10       | Inductor    | 10 nH          | 0402 | Murata LQG           | LQG15HS10NJ02     |
| M11       | Resistor    | 562 $\Omega$   | 0402 | Kamaya RMC, 1/16S 1% | RMC1/16SK5620FTH  |
| M13       | Capacitor   | 2.2 pF         | 0402 | Murata GRM           | GRM1555C1H2R2CZ01 |
| M14, M16  | Resistor    | 0 $\Omega$     | 0402 | Kamaya RMC, 1/16S    | RMC1/16SJPTH      |
| M15       | Resistor    | 1 k $\Omega$   | 0402 | Kamaya RMC, 1/16S 1% | RMC1/16SK1001FTH  |

**Table 9. SKY67150-396LF Evaluation Board Bill of Materials (380 to 530 MHz Tuning)**

| Component   | Description | Value          | Size | Manufacturer         | Part Number       |
|-------------|-------------|----------------|------|----------------------|-------------------|
| M1          | Inductor    | 12 nH          | 0603 | Coilcraft HP         | 0603HP-12NX_L     |
| M2, M7, M15 |             | DNP            |      |                      |                   |
| M3          | Capacitor   | 20 pF          | 0402 | Murata GJM           | GJM1555C1H200JB01 |
| M4          | Inductor    | 150 nH         | 0402 | Coilcraft HP         | 0402HPH-R15X_L    |
| M5, M17     | Capacitor   | 1000 pF        | 0402 | Murata GRM           | GRM1555C1H102JZ01 |
| M6          | Resistor    | 9.1 k $\Omega$ | 0402 | Kamaya RMC, 1/16S 1% | RMC1/16S-9101FTH  |
| M8          | Capacitor   | 10000 pF       | 0402 | Murata GRM           | GRM155R71H103KA88 |
| M9, M12     | Capacitor   | 10 pF          | 0402 | Murata GRM           | GRM1555C1H100JZ01 |
| M10         | Inductor    | 22 nH          | 0402 | Murata LQG           | LQG15HS22NJ02     |
| M11         | Resistor    | 330 $\Omega$   | 0402 | Kamaya RMC, 1/16S 1% | RMC1/16SK3300FTH  |
| M13         | Capacitor   | 1.8 pF         | 0402 | Murata GRM           | GRM1555C1H1R8CZ01 |
| M14         | Resistor    | 15 $\Omega$    | 0402 | Kamaya RMC, 1/16S    | RMC1/16SK15R0FTH  |
| M16         | Resistor    | 0 $\Omega$     | 0402 | Kamaya RMC, 1/16S    | RMC1/16SJPTH      |

**Table 10. SKY67150-396LF Evaluation Board Bill of Materials (1400 to 2200 MHz Tuning)**

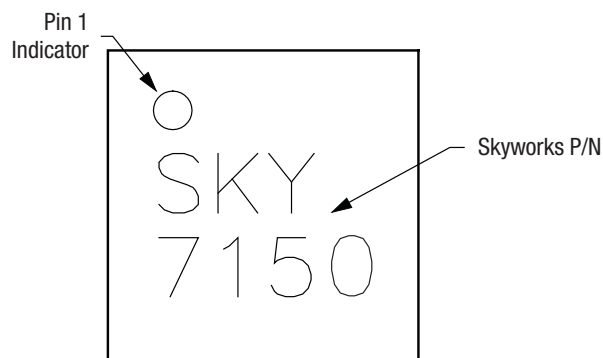
| Component | Description | Value        | Size | Manufacturer        | Part Number       |
|-----------|-------------|--------------|------|---------------------|-------------------|
| M1        | Capacitor   | 20 pF        | 0402 | Murata GJM          | GJM1555C1H200JB01 |
| M2        |             | DNP          |      |                     |                   |
| M3        | Inductor    | 2.7 nH       | 0402 | Coilcraft HP        | 0402HP-2N7XJ_L    |
| M4        | Inductor    | 12 nH        | 0402 | Coilcraft HP        | 0402HP-12NX_L     |
| M5        | Capacitor   | 1000 pF      | 0402 | Murata GRM          | GRM1555C1H102JZ01 |
| M6        | Resistor    | 9.1 k        | 0402 | Kamaya RMC 1/16S 1% | RMC1/16S-9101FTH  |
| M7        |             | DNP          |      |                     |                   |
| M8        | Capacitor   | 10,000 pF    | 0402 | Murata GRM          | GRM155R71H103KA88 |
| M9        | Capacitor   | 10 pF        | 0402 | Murata GRM          | GRM1555C1H100JZ01 |
| M10       | Inductor    | 12 nH        | 0402 | Coilcraft HP        | 0402HP-12NX_L     |
| M11       | Resistor    | 562 $\Omega$ | 0402 | Kamaya RMC 1/16S 1% | RMC1/16SK5620FTH  |
| M12       | Inductor    | 3.3 nH       | 0402 | Murata LQG          | LQG15HS3N3S02     |
| M13       |             | DNP          |      |                     |                   |
| M14       | Capacitor   | 100 pF       | 0402 | Murata GRM          | GRM1555C1H101JZ01 |
| M15       |             | DNP          |      |                     |                   |
| M16       | Resistor    | 0 $\Omega$   | 0402 | Kamaya RMC 1/16S    | RMC1/16SJPTH      |
| M17       | Capacitor   | 1000 pF      | 0402 | Murata GRM          | GRM1555C1H102JZ01 |



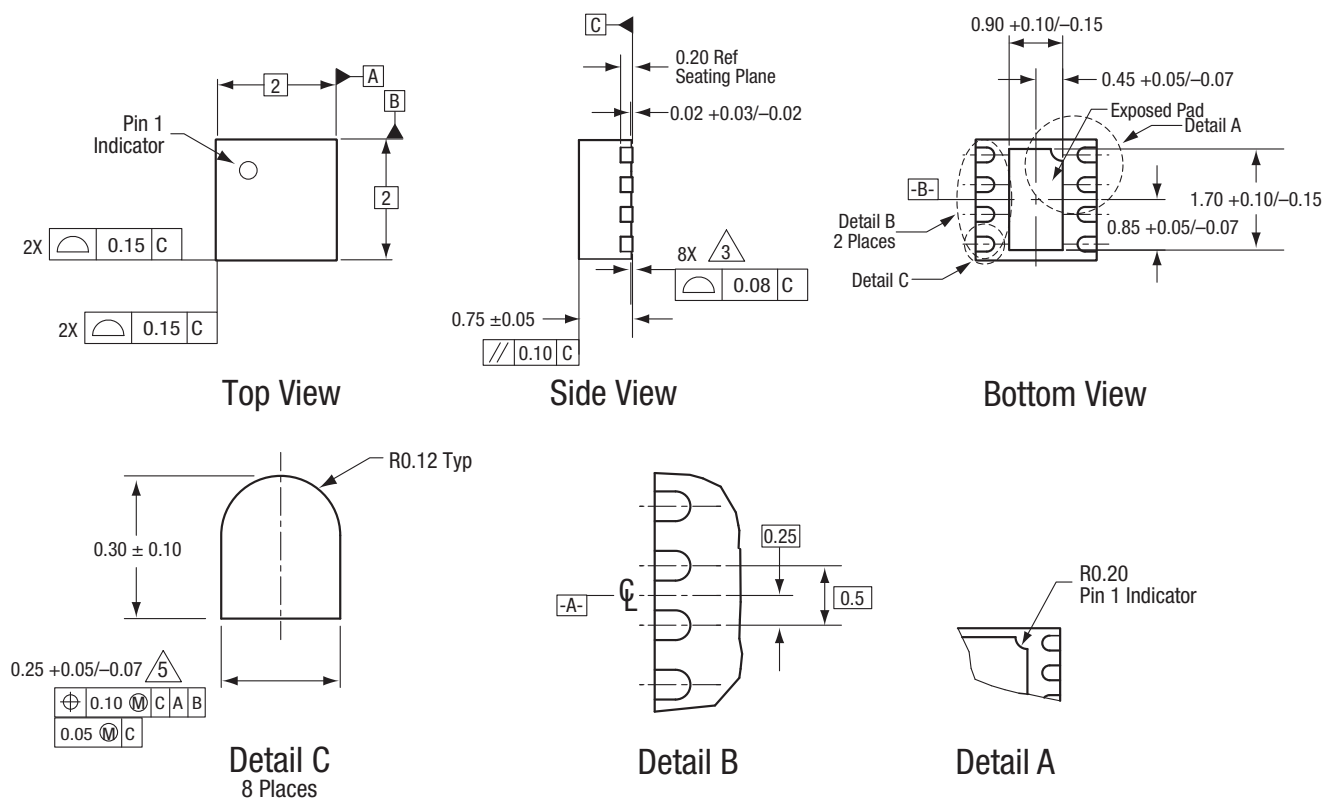
All dimensions are in millimeters

Y0005

**Figure 21. SKY67150-396LF PCB Layout Footprint (Top View)**



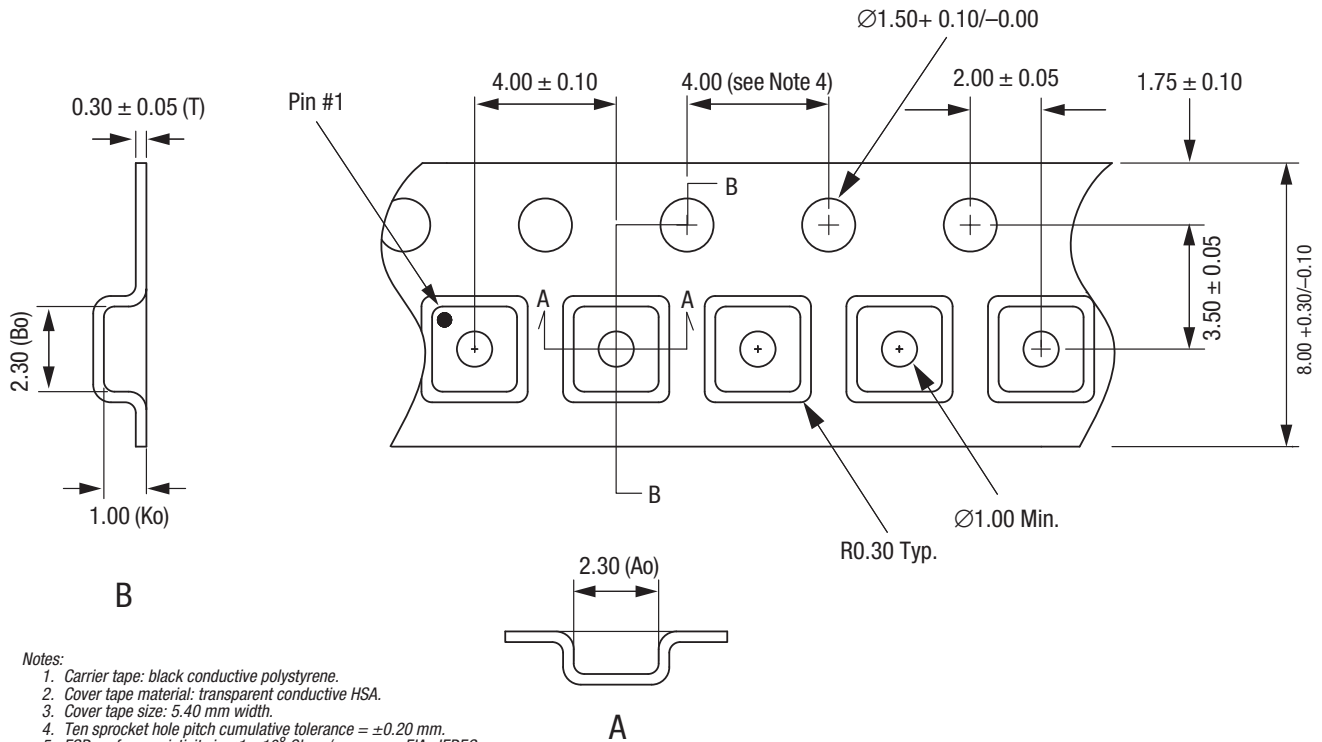
**Figure 22. Typical Case Markings (Top View)**



All measurements are in millimeters.  
 Dimensioning and tolerancing according to ASME Y14.5M-1994.  
 Coplanarity applies to the exposed heat sink slug as well as the terminals..  
 Plating requirement per source control drawing (SCD) 2504.  
 Dimension applies to metallized terminal and is measured between 0.15 mm and 0.30 mm from terminal tip.

S1945

**Figure 23. SKY67150-396LF 8-Pin DFN Package Dimensions**



**S1601**

### Figure 24. SKY67150-396LF Tape and Reel Dimensions

## Ordering Information

| Model Name         | Manufacturing Part Number | Evaluation Board Part Number  |
|--------------------|---------------------------|---|
| SKY67150-396LF LNA | SKY67150-396LF            | SKY67150-396LF-EVB (650-1100 MHz)<br>SKY67150-396LF-EVB (380-530 MHz)<br>SKY67150-396LF-EVB (1400-2200 MHz) |

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